Junior Chemistry obtained a favourable report; but the Seniors displayed lack of reasoning power, with great readiness to reproduce cut-and-dried statements from books. In Heat the results of the examination were encouraging and satisfactory. In Experimental Physics generally there was great lack of practical acquaintance with the subjects. Only one candidate did really well among the Seniors. In Botany the answers were weak throughout, showing great lack of teaching by real objects handled by the students. Zoology appears to have been too much studied by Juniors from older and worthless text-books. The Seniors did better, but spread themselves over too wide a field of work. The knowledge of Physical Geography was better than that of Geology, but neither was good.

The report recently made by Mr. R. D. Roberts of his visits to the centres where local lectures have been established, and on the present state of the local lectures' scheme, contains many most interesting facts regarding the high appreciation with which the intelligent working classes regard the lectures, and the difficulties which the cost of the lectures occasions. Of the results of a course of electricity at Newcastle, the examiner says that the work done in answer to a long and difficult paper of questions was fully equal to that attained in a scientific University course. The greatest difficulty that occurs is not lack of demand for or interest in education, but the provision of funds to meet the expenses. If a solution of this could be found, the scheme would be taken up largely in towns where it is now out of the question. The people who are eager for knowledge and travel long distances to obtain it, in all kinds of weather over the roughest roads, are just those who, if they must pay for the lectures, must have less bread for their families. This is certainly the case with the Northumberland and Durham miners. Whether the State will in some way assist in providing the knowledge and teaching which are so eagerly desired, must be again made a practical and urgent question.

The following are the lectures in Chemistry, Physics, and Mineralogy for the Easter Term (el. signifies elementary, ad. advanced):—

Elementary Course of Chemistry, by a Demonstrator; General Course, continued, Mr. Main, St. John's College; Non-metals, continued, and Organic Chemistry, el., Mr. Pattison Muir; General Principles, continued, and Organic Chemistry, ad., Mr. Muir, Caius College; Organic Chemistry, el., Mr. Scott (Prof. Dewar's assistant); Demonstrations in Gas Analysis, Mr. Scott; Sound, Lord Rayleigh; Heat, Mr. Trotter, Trinity College; Physics, el., Mr. Glazebrook, Trinity College; Physics, el., Mr. Shaw, Emmanuel College; Physics, ad., papers, Mr. Glazebrook an dMr. Shaw; Chemistry and Physics, el., papers, Mr. Pattison Muir and Mr. Shaw.

Practical Chemistry, University, St. John's, Caius, and Sidney College Laboratories.

Practical Physics, Cavendish Laboratory; Demonstrations in Light and Acoustics; and in Optics and Electricity, el.

Mineralogy, Course by Prof. Lewis, and Demonstrations for both parts of the Natural Sciences Tripos.

The following arrangements have been made by Prof. Hughes for lectures during the Easter term:—Local Stratigraphy, Prof. Hughes; Geology (General Course, continued), by Dr. R. D. Roberts, Clare College; Petrology, Mr. Harker, St. John's College; Palæontology, Mr. T. Roberts, St. John's College. Dr. R. D. Roberts will continue to set papers and superintend the course of reading of students in the Museum.

The Strickland Curatorship being about to become vacant, Mr. Salvin having completed his valuable catalogue, a new code of regulations for the Curatorship has been drawn up. The Strickland Curator is to be appointed by Mrs. Strickland, the foundress, during her lifetime; then by Mrs. Catherine Strickland in case she shall survive the foundress; and, after her decease, by the Superintendent of the Cambridge Museums of Zoology and Comparative Anatomy. In addition to caring for the Strickland Collection, the Curator is to take charge of any University ornithological collections, to catalogue them, to assist scientific visitors in studying the ornithological collections, and to aid and promote the progress of ornithological science.

UNIVERSITY COLLEGE, LONDON.—Twenty lectures on Quantitative Analysis will be delivered by Richard T. Plimpton, Ph.D., on Mondays and Fridays at 3 o'clock, during the third term. The first lecture will be given on April 13.

PROF. STOKES, Lucasian Professor of Mathematics in the University of Cambridge, has been appointed to deliver the first course of lectures on Natural Science under the auspices of the Burnett Literary Fund, Aberdeen.

THE Earl of Zetland has given 500*l.* to the Edinburgh Association for the University education of woman to found a bursary for the benefit of its students. This bursary will be known as the Earl of Zetland's Bursary.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 8.—"Note on the Order of Reversibility of the Lithium Lines," by Professors Liveing and Dewar.

In their communications on the reversal of the lines of metallic vapours, the authors have several times noticed (*Proc. Roy. Soc.* vol. xxviii. pp. 357, 369, 473) the reversal of the lithium lines, and concluded that the blue line is more easily reversed than the orange line. This, however, does not appear to be really the case. When much lithium is introduced into the arc, a second blue line is developed close to but slightly more refrangible than the well-known blue line. This second blue line produces with the other the appearance of a reversal, which deceived the authors until they became aware of the existence of the second line. The blue line (wave-length 4604) is really reversed without difficulty when sufficient lithium is present, but under these circumstances the orange line is also reversed. The latter line is also the one which first (of the two) shows reversal, and also the one which is more persistently reversed. Hence they place the lines in order of reversibility as follows: red, orange, blue, green, violet.

Mathematical Society, March 8.—Prof. Henrici, F.R.S., president (and subsequently Sir J. Cockle, F.R.S., vice-president), in the chair.—Mr. Alfred Lodge, Fereday Fellow of St. John's College, Oxford, was elected a Member, and Major Allan Cunningham and Mr. H. T. Gerrans were admitted into the Society.—Prof. Henrici feelingly announced, in a few well-chosen sentences, the loss the Society had sustained since its last meeting by the death of Prof. Henry Smith, one of its most distinguished ornaments, and who had been a Member almost from its commencement in 1865. The loss to mathematics in this country was almost irreparable, and it would be hard to find anywhere a fitting successor to him as an exponent of the higher geometry. It had been said that there were not half a dozen mathematicians in Europe who could breathe on the mathematical heights to which he was accustomed; it was further true that few were so fitted as he for introducing others to those heights. His charm of manner and power of fixing the attention of his hearers were wondrous, and were as strikingly exhibited at the December meeting of the Society (the last meeting at which he was present) as on any previous occasion. What Clifford once said when reading a paper by Hesse might be said with equal truth of Henry Smith's papers: "This is reading poetry." [Perhaps this Society will miss him more than any other; he was always willing, if possible, to respond to the Secretary's request for a paper, and he was a true imitator of the Jewish king, for he never gave us of that which cost him nothing. "Everything that he did was as perfect as he could make it." In a letter now before us the writer says truly: "Of all who 'knew' him, none knew or saw *him himself* as we did at the Mathematical Society." "Very pleasant" was he to us, and his death has left a void in our ranks which time will hardly fill.]—Mr. J. W. L. Glaisher made a communication on the calculation of the hyperbolic logarithm of π.—Mr. Tucker read (in its entirety) a paper by Prof. Cayley entitled "On Monge's 'Mémoire sur la Théorie des Déblais et de Remblais.'"—Mr. J. Hammond made a few critical remarks on a recent paper by Prof. Sylvester in the *American Journal of Mathematics*.

Zoological Society, March 6.—Osbert Salvin, F.R.S., vice-president, in the chair.—The Secretary exhibited, on behalf of the Rev. F. O. Morris, the drawing of a bird shot in Hampshire in November, 1882, which it was suggested represented a Tinamou of some species that had escaped from captivity.—Mr. J. E. Ady exhibited some microscopical preparations of bone, in one case showing the growth of blood-vessels into cartilage previous to ossification, and in another case presenting a hard section in which the lacunæ and canaliculi were extremely well shown.—Dr. Hans Gadow read a paper on the laryngeal muscles of birds, and pointed out first that the muscles of the syrinx are developed from the sterno-hyoid muscles; and,

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secondly, that the cutaneous muscles are derived from superficial layers of the common muscular stratum. Thirdly, the author considered the connection between muscle and nerve-supply, illustrating his remarks by diagrams.—A communication was read from the Rev. H. S. Gorham, F.Z.S., containing the descriptions of some new species of Coleoptera belonging to the family Erotylidæ. Twenty-nine new species of this family were described, of which ten were from the Philippine Islands, three were from the Andaman Islands, two from Assam, two from the Malay district, six from Africa, and six from Peru. The species treated of belonged chiefly to the subfamilies *Encaustini* and *Dacnini*, the author reserving the remaining subfamilies for a future communication.—Dr. Gwyn Jeffreys read the sixth part of his communications on the Mollusca procured during the *Lightning* and *Porcupine* Expeditions. This included an account of the specimens of the groups of *Scissurella*, *Trochus*, *Turbo*, and part of *Littorina*, referable altogether to seventy species. Four genera and twenty species were for the first time described as new. —A communication was read from Mr. H. O. Forbes, F.Z.S., describing a species of scarlet *Myzomela* obtained in the Island of Boeroe, one of the Ceram group.—Mr. G. A. Boulenger read a paper on the Geckos of New Caledonia. The object of the author in preparing this paper was that it might serve as a guide to the identification of the Geckotidæ of New Caledonia, and at the same time bring the synonymy into order. To this end the author had compared the typical specimens in the Museums of Brest, Lisbon, Paris, and Brussels with those in the British Museum, and had given short descriptions of every species taken from typical or well-authenticated specimens. The number of species of Geckotidæ actually known from New Caledonia was fourteen: of these two were recorded for the first time, one being new to science.

Geological Society, February 21.—J. W. Hulke, F.R.S., president, in the chair.—Rev. John Birks, Capt. James Scott Black, John Bradford, Thomas Alexis Dash, Henry Lewis, and Thomas Morris were elected Fellows of the Society.—The following communications were read:—On the relation of the so-called "Northampton Sand" of North Oxfordshire to the Clypeus-Grit, by Edwin A. Walford, F.G.S.—Results of observations in 1882 on the positions of boulders relatively to the underlying and surrounding ground in North Wales and North-West Yorkshire; with remarks on the evidence they furnish of the recency of the close of the Glacial period, by D. Mackintosh, F.G.S. The author entered into a consideration of the time which has elapsed since the close of the Glacial period, and stated the main results of his observations as follows:—1. That the average *vertical extent* of the denudation of limestone rocks around boulders has not been more than six inches. 2. That the average *rate* of the denudation has not been less than one inch in a thousand years. 3. That a period of not more than six thousand years has elapsed since the boulders were left in their present positions by land-ice, floating-ice, or both.—Notes on the Corals and Bryozoans of the Wenlock Shales (Mr. Maw's washings), by G. R. Vine. Communicated by Prof. P. Martin Duncan, F.R.S.

Entomological Society, March 7.—Mr. J. W. Dunning, M.A., F.L.S., president, in the chair.—Three new members were elected.—Exhibitions: A specimen of *Polistes hebræus*, Fabr., an East Indian wasp, captured alive in one of the London docks, by Mr. R. McLachlan; Two British Ichneumons, and an orthopterous insect (*Copiophora cornuta*, De Geer) from Central America, by Mr. T. R. Billups; A preparation showing the structure of the thorax in a large beetle (*Chalcolepidius porcatus*, Linn.), by Dr. D. Sharp.—Paper read: "Further additions to Mr. Marshall's Catalogue of British *Ichneumonidæ*," by Mr. J. B. Bridgman.

Physical Society, March 10.—Prof. G. C. Foster in the chair.—New Member, Major W. S. Boileau.—Mr. Shellford Bidwell read a paper on a new method of measuring resistances with constant currents. It consists in placing a resistance-box in the arm of the bridge which afterwards has to contain the unknown resistance. A balance is effected by unplugging resistance in this box. The unknown resistance is then inserted in the same arm, and the balance restored by plugging resistance out of the box. The amount plugged out equals the unknown resistance.—Prof. F. Guthrie made a communication on liquid slabs. Films of liquid, spread out like a flattened drop on a solid surface, are found by the author to have a thickness which is a physical constant for the same liquid, provided the area is very great in proportion to the thickness. Sodium amalgam inserted in a mercury slab causes it to spread out further. Prof. Guthrie also finds that an electric current increases the diffusion of sodium amalgam through mercury in the direction of the current.—Mr. Baily suggested that, as the diffusion produces a current, an opposing current might be found to stop the diffusion. Mr. Stanley said the largest water-drop he had measured was one-fifth of an inch in diameter.

EDINBURGH

Mathematical Society, March 12.—Mr. J. S. Mackay, M.A., F.R.S.E., president, in the chair.—Prof. Chrystal, in his address on "Present Fields of Mathematical Research," remarked at the outset that the times seemed peculiarly suitable for the foundation of such a society in Scotland where, as in England and America, the tide of mathematical research had certainly begun to flow. The direct effect of the work of the society would be to keep alive the interest of its members in mathematics, and especially, by division of labour, to benefit the teacher whose daily tasks leave him somewhat unfitted to undertake in moments of leisure the reading necessary to keep him abreast of the time. Further, such benefits would surely extend their influence to the improvement of secondary education in Scotland. The lines along which members might advantageously work were then indicated in a suggestive sketch of the history in modern times of geometry and algebra. Descartes' system of analytical geometry was the first great step, though for long it remained simply a series of solutions of special problems. The discovery and development of the calculus no doubt kept analytical geometry for a time in the background; but there is every reason to believe that great progress in developing geometrical methods was effected by Pascal, Desargues, Newton, and Maclaurin. With them originated the idea of projection, which was systematised into a powerful geometrical method by Monge and his disciples, Poncelet, Chasles, Brianchon, and others. Monge also, however, established the analytical side of geometry, as well as the synthetic, upon an independent basis; his work has been ably supplemented by Dupin and others, and more especially by Plücker. The treatment by the latter geometer of the singularities of higher plane curves, his introduction of the abridged notation, and his invention of the system of line geometry, have been developed each into an extensive branch of mathematics. At the same time algebra has been differentiating itself into well-marked parts. The theories of forms, of equations, of substitutions, and of determinants have been greatly developed by Abel, Jacobi, Galois, Cayley, Sylvester, Jordan, Clifford, and others. The address concluded with a reference to the theory of transcendents and the closely-related properties of the complex variable. A hearty vote of thanks was accorded to Prof. Chrystal on the motion of Prof. Blyth of Glasgow, seconded by Mr. Muir of Glasgow.

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